

Questions for the Crosscutting Mathematical Methods and Computer Science/Infrastructure Breakout Sessions

These sessions will follow reports from the Applications breakout sessions.

1. List the application areas for which you think that work in your crosscutting area could be used to overcome the barriers. For each such applications area, provide the following information.
 - Characterize the degree of difficulty of providing the needed contributions, from easy (a routine application of known technology) to difficult (requires new research ideas).
 - Characterize the cost of providing the required capabilities, from inexpensive (software already exists) to expensive (a large software development effort would be required).
 - To what extent are there new ideas that have not yet been recognized or used by this application community, but have the potential to make a revolutionary change in the way simulation is done for this application?

Group the requirements obtained from (1) into one or more related topics. For each topic, answer the remaining questions.

2. How would you measure success?
 - What specific new tools or other qualitative or quantitative increments in capability in this crosscutting area would lead the removal of which specific barriers in the applications areas?
3. What are the resources required?
 - Characterize the current capabilities, in terms of size of software base and level of capability? How do they differ from that which would be required to achieve the goals in (1)?
 - What level of effort would be required to move from the current capability to the one required to achieve the goals in (1)? Specify in terms of the number of people, number of teams, and skill level.
 - How long would it take to develop the new capabilities?
 - What resources and institutional commitments would need to be made to support the software investment over its lifetime. As a starting point for this exercise, assume a 20-year lifetime.

- What is the level of hardware resources required?
 - Who currently funds related activities, and at what level?
4. What are the barriers to achieving the goals in (1), in terms of requirements this area might have for the other crosscutting areas ?
- What are the hardware barriers?
 - What are the algorithmic barriers?
 - What are the software barriers?